

Appl. No. 10/640,340  
Amdt. Dated July 27, 2006  
Reply to Office Action of December 16, 2005

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### Amendments to the Claims

This listing of claims will replace all prior versions and listings of claims in the application:

### Listing of Claims:

Claim 1 (currently amended): A carbon nanotube-based device comprising:

a substrate;

a plurality of alloy catalytic nano-sized particles formed on the substrate, said alloy catalytic nano-sized particles each comprising a catalyst material and a catalyst dopant material, a content of said catalyst dopant material gradually one of increasing and decreasing along a predetermined direction on said substrate; and

an aligned carbon nanotube array extending from the alloy catalytic nano-sized particles and progressively bending in another predetermined direction on said substrate. a predetermined direction; wherein

~~said alloy catalytic nano-sized particles each comprise a catalyst material and a growth-affective material, the growth-affective material being capable of varying a reaction rate of synthesis of carbon nanotubes of the carbon nanotube array.~~

Claim 2 (original): The carbon nanotube-based device as claimed in claim 1, wherein the substrate comprises silicon, quartz or glass.

Claim 3 (original): The carbon nanotube-based device as claimed in claim 1, wherein the catalyst material is selected from the group consisting of iron, cobalt, nickel, molybdenum, ruthenium, manganese, and any suitable

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combination alloy thereof.

Claim 4 (currently amended): The carbon nanotube-based device as claimed in claim 1, wherein the ~~growth-affective~~ catalyst dopant material comprises copper, molybdenum, or a combination of copper and molybdenum.

Claims 5-18 (canceled)

Claim 19 (currently amended): A carbon nanotube-based device comprising:

a substrate;

a plurality of alloy catalytic nano-sized particles formed on the substrate, said alloy catalytic nano-sized particles each comprise a catalyst material and a catalyst dopant material, a content of said catalyst dopant material one of increasing and decreasing along a direction on said substrate; and

an aligned carbon nanotube array respectively extending from the alloy catalytic nano-sized particles with gradually respective one of increasing lengths and decreasing lengths of said carbon nanotubes of the carbon nanotube array arranged along ~~[[a]]~~ said direction on said substrate; ~~wherein~~

~~said alloy catalytic nano-sized particles each comprise a catalyst material and a growth-affective material, the growth-affective material being capable of varying a reaction rate of synthesis of carbon nanotubes of the carbon nanotube array.~~

Claim 20 (canceled)

Claim 21 (new): A carbon nanotube-based device comprising:

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a substrate;

a plurality of alloy catalytic nano-sized particles formed on the substrate, said alloy catalytic nano-sized particles each comprising a catalyst material and a catalyst dopant material, said catalyst dopant material being in a form of a layer, said layer one of thickening and thinning along a predetermined direction on said substrate; and

an aligned carbon nanotube array extending from the alloy catalytic nano-sized particles and progressively bending in another direction on said substrate.

Claim 22 (new): The carbon nanotube-based device as claimed in claim 21, wherein the catalyst material is comprised of at least one material selected from the group consisting of iron, cobalt, nickel, molybdenum, ruthenium, and manganese.

Claim 23 (new): The carbon nanotube-based device as claimed in claim 21, wherein the catalyst dopant material comprises at least one of copper and molybdenum.